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AUTHOR Coulson, R. I.
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ABSTRACT

This study investigated young children's ideas about food. During individual interviews, children were asked questions about food. First, they were shown pictures of foods and asked to group the pictures into a pile of pictures of fruit and a pile of pictures classified as "not fruit". Except for orange juice, actual fruits were accurately classified as such. The number of errors made in categorization decreased with age. Second, children were asked to categorize each food as "good for you" or "not good for you." Lettuce, carrots, and most fruits were seen as good by all children. Foods considered not good included chocolate biscuits, cakes, and dry biscuits. Third, children were asked why people needed to eat food and how food helps one grow. Children were provided with an outline of a human figure and were asked to draw the path food follows after it is taken into the body and to describe the path. Children's drawings dispayed varying levels of understanding of digestive and nutritive processes. In general, results indicated that traditional food categories are not well understood by young children. A list of 13 references is included. (BC)

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YOUNG CHILDREN'S PERCEPTIONS OF THE ROLE OF FOOD IN THEIR BODIES

R I Coulson

University of Melbourne
School of Early Childhood Studies
4 Maddern Grove
Kew, Victoria 3101
Australia

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The relationship between nutrition and health is well documented, and promotion of improved nutrition has become an important aspect of public health endeavour in Australia (Commonwealth Department of Health, 1983; Better Health Commission, 1986). The challenge for those of us concerned with health care or education is to ensure, as far as possible, that the people for whom we are responsible are equipped to lead healthy lives.

One aspect of my work is lecturing to preservice kindergarten teachers and child care workers in the area of child health and nutrition. Early childhood educators are in an ideal position to have a positive influence on the long-term health of the children in their care. Nutrition education at preschool level can help young children to develop attitudes towards food and eating which will stand them in good stead as they grow up. The importance of early training was highlighted by Beyer and Morris (1974) who found in a longitudinal study that children's eating patterns remained fairly stable over time.

In planning a nutrition education program at any level it is essential to make it appropriate to the needs of the learners. It must be developmentally appropriate and it must also take into account the learners' existing conceptions. We know that children do not come to school or even to preschool as 'blank slates'. They bring with them their own ideas about the world, ideas which have been built up as a result of a whole range of experiences since birth (Bloom and Borstad, 1990; Wellman and Johnson, 1982). New information will be assimilated in terms of the child's current conceptual framework and so does not always lead to the type of understanding the teacher might expect. It is, therefore, important to know what children think.

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The aim of this study was to increase understanding of the way young children think about food. Studies reported in the literature of children's conceptions of health and illness (eg Green and Bird, 1986; Wilkinson, 1988) indicate that young children view the food eaten as an important factor in determining whether a person was ill or well. While there are several reports of health education programmes for young children (eg Kingsbury and Hall, 1988) and of programmes which focus on nutrition education (eg Herr and Morse, 1982), very few studies report more specific findings regarding children's concepts about food. Wellman and Johnson (1982) found that while children of all ages were aware of a relationship between food and weight and health, younger children (6 years of age) were more influenced by the quantity of food involved than the type of food, although they did discriminate to some extent. The appropriateness of traditional food groups as the

basis for nutrition programmes for young children has been questioned by Herr and Morse (1982) who argue for 10 food categories on the premise that "(use of) the basic 4 groups requires too many generalizations for a young child to be able to combine dissimilar foods into a single group". For example, eggs and meat are both good sources of iron and protein and so are traditionally grouped together, but this grouping is not sensible to a 4 year old child . Even classifying foods as fruit or vegetable can cause difficulties for preschool children (Gorelick and Clark, 1985).

Some workers (eg Gellert, 1962; Porter, 1974) have researched children's understandings of their internal body parts and found that children below 7 years of age rarely mentioned any of the digestive tract when asked to name or draw the parts inside them, but were more likely to name food or drink as being inside them.

Subjects in this study were the children enrolled in a kindergarten situated in the grounds of the University of Melbourne. The children ranged in age from 3 years 6 months to 5 years 3 months with a mean age of 4 years 6 months. Each child was interviewed individually, but as these interviews took place in the main room of the centre they were sometimes observed by other children. At the start of the interview I asked the children to identify pictures of various types of food. This simple activity helped to establish rapport with the child and also served as an introduction to discussion about categories of food and of the effects of food on the body. During a preliminary trial, pictures that appeared to be ambiguous or difficult to identify were discarded, leaving 23 clear pictures of commonly eaten foods that were familiar to the children.

CATEGORIZATION OF FOODS

I asked the children to group into one pile all of the pictures of fruit. Everything else was simply classified as 'not fruit'. Figure 1 indicates the number of errors of categorization for each food item. Actual fruits were generally accurately classified as such, with the notable exception of the orange juice. All of the children had correctly identified the picture as 'orange juice', or 'juice', ie none of then thought of it as cordial or soft-drink, and yet more than half of the children said that it was not fruit.

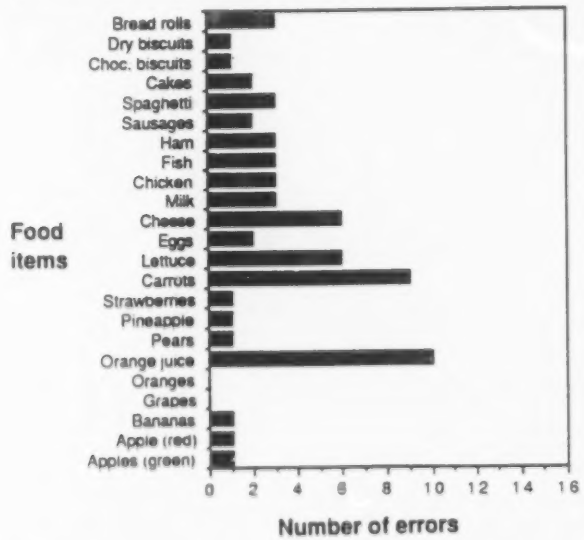

Figure 1. Errors made by children (n=16) in categorizing food items as 'fruit' or 'not fruit'.

I did not ask the children to define the term 'fruit', but spontaneous comments made by some of the children during the grouping exercise helped to shed light on their internal definitions of fruit. Hilary (age 4 years 1 month), for example, said "Milk's not fruit, milk's for drinking". Hilary had also put orange juice into the 'not fruit' pile and it is likely that the 'for drinking so not fruit' criterion was used in that case too. The perceived texture of fruit could also help to explain the high proportion of children who said that carrots and, to a lesser extent, lettuce and cheese were fruit. Culturally derived concepts of when particular types of food are eaten also influenced the children's ideas about fruit. Belinda (age 3 years 8 months) said about both eggs and fish: "That's not fruit .... that's dinner". Carrots and cheese are both often served to children as healthy snacks at the same time as they are usually given fruit. In a review of factors affecting children's food preferences, Birch (1987) noted the importance of social influences which included cultural 'rules' about when it was appropriate to eat different foods.

The number of errors made in categorization of the foods was inversely related to age (see Fig. 2). This relationship was significant at the 0.05 level and presumably reflects the effect of increased experience with the concept, as well as a possible maturation of classifying ability. The errors made by the older children were almost all with orange juice, carrots and cheese.

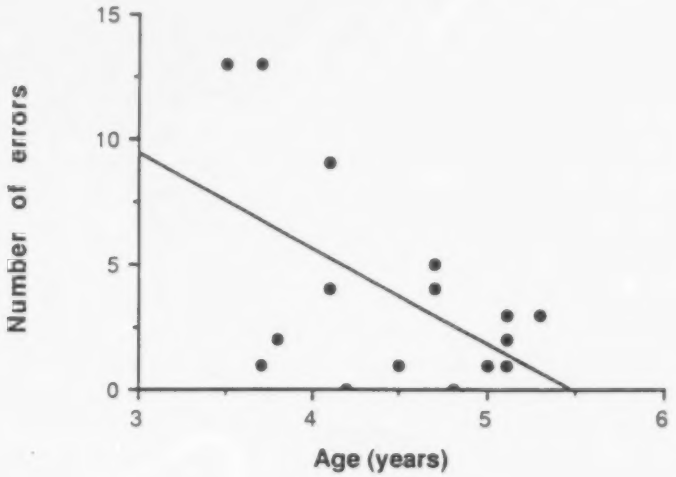

Figure 2. Linear regression showing relationship between age of child and number of errors made in categorizing food items as 'fruit' or 'not fruit'. $r^2=0.29$, $p<0.05$.

I also asked the children to categorize each food as 'good for you' in terms of 'helping you to grow or stay healthy', or 'not good for you'. As can be seen from Figure 3, most fruits and lettuce and carrots were considered 'good' by all of the children. Milk, cheese and meats were usually 'good' too. Several children responded that eggs were 'not good'. No comments were offered by the children to help explain this categorization, but it might relate to individual experiences of family awareness of cholesterol in the diet.

Overwhelmingly, the food 'villains' so far as these children were concerned were chocolate biscuits, followed by cakes (iced patty cakes). Spontaneous comments by the children included: "You'll get sick", "They make you fat" and "Those have got

sugar in them". Only Daniel urged moderation: "If you have too many you'll get sick - a few is *(sic)* all right". Dry biscuits seemed to earn black marks by association with biscuits in general and chocolate biscuits in particular.

In general conversation several children volunteered that sugar and foods perceived as containing sugar were 'bad for you'. Only one child mentioned salt in this context and none mentioned fatty foods. "My mum" was cited as the source of information.

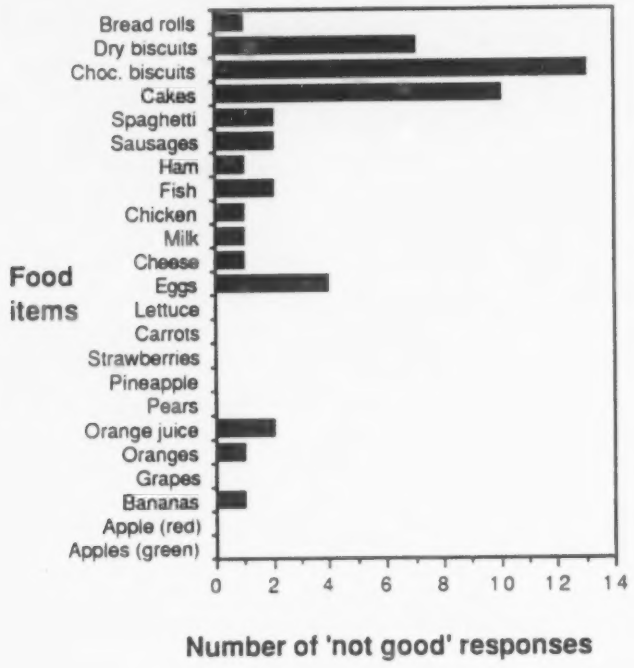

Figure 3. Categorization by children (n=14) of food items as 'good for you' or 'not good for you'.

ROLE OF FOOD

I was also interested in the children's perceptions of the role of food in their bodies. When asked why you need to eat food children tended to reply "It makes you strong" or "So you grow strong and healthy". If asked **how** does food help you to grow the answer was likely to be "Because you eat it".

Questioning the children about what happens to food when they eat it produced some fascinating responses. I provided the children with a body outline drawn on paper, and asked them to draw what happened to the food as well as telling me about it.

Most children said the food went into their 'tummy', but their drawings revealed that only a few of the older children considered this to be a discrete part of their body. Most of the children simply drew food items in the general abdominal area of the body outline.

Figure 4 is the drawing done by Sam, aged 5 years 1 month, to show what happens to 'bickies' when you eat them. He said "They get all crunched up by your teeth . . . they go down . . . then they're in your tummy where they stay."

Figure 4. Sam's drawing showing what happens when food is eaten.

About half of the children seemed to share Sam's idea that the tummy (whether a discrete organ or not) was the end-point for the food. This did not appear to be age related.

Others envisaged food items moving further around their bodies. Natasha for example, aged 5 years 0 months, drew what happens when a person eats an orange (Fig 5). "It goes into their mouth, gets sucked into the neck and goes into the tummy where it gets all scrunched up, then it goes down to the toe." It stops in the toe unless they "...lift their leg up in the air, ... or do a somersault", which makes it fall back to the tummy again. This perception of food going down and not up was shared by several other children and presumably reflects their general understanding of what happens when objects are dropped.

Interestingly, some of the youngest children had less restrictive views - Gemma, aged 3 years 6 months, said that food "goes down here and all around" (see Fig 6) then "comes out here", pointing to the space between the legs.

About half of the children talked about food leaving the body as "poo"; only 2 talked about urination. Both of these children envisaged particular items ending up as "wee" - drink in one case, and lemon in the other.

These findings on children's understandings of what happens to food in their bodies are consistent with those reported by Gellert (1962) and Porter (1974) for the younger children (aged 4 to 7 years) in their studies of children in the United States of America.

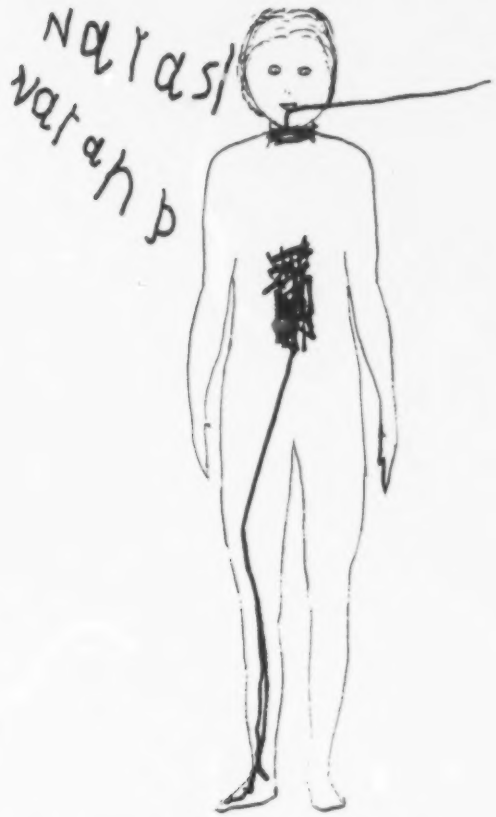

Figure 5. Natasha's representation of the path of an orange within the body.

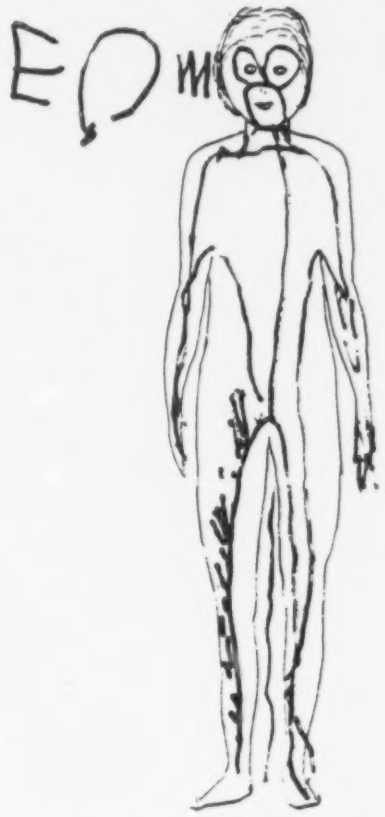

Figure 6. Gemma's drawing of food going all around the body.

IMPLICATIONS FOR NUTRITION EDUCATION

The information gained from this study provides useful background information for planning nutrition education programmes for young children.

My results support the suggestion by Herr and Morse (1982) and Gorelick and Clark (1985) that traditional food categories are not well understood by young children. Nutrition education programs must be appropriate to the developmental level of the children concerned, and more research is needed to determine appropriate strategies for preschool children.

The readiness of young children to accept the authority of important adults (such as "my mum", cited as the source of information by children in this study) and to follow the eating patterns modelled by them (Birch, 1987) also underlines the importance of parents and early childhood educators being aware of the effect that their own behaviour has on the children, and of the incidental nutrition learning that can occur.

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